CIE DIVISION 6
Photobiology and Photochemistry

Minutes

Thursday, 4 September 1997
Ninth Floor, ESKOM Building, Durban, South Africa

1. The Division Director (DD6), Dr. Sliney, opened the meeting at 0:900. The participants introduced themselves. The following attended the meeting:

Kjeuhige Daae, HIBU, Norway
Jan Grzonkowski, CIE-Polard
Natasha van Tonder, CSIR (NML), Pretoria, South Africa
Rolf S. Bergman, GE Lighting, Cleveland, OH, USA
Gerrit van den Beld, Philips Lighting, CIE Holland, Einhoven, Netherlands
Chrisita Ackermann, Ackermann Laboratories, South Africa Member D6
John Khowlbon, Justria-AVON, (Pty) Ltd, South Africa
Richard Vincent, Chair, TC 6-34, Vincent Consulting, New York, NY, USA
Hans-Allen Lofberg, CIE VPT, Swedish Building Institute, Sweden
Elizabeth Rozeva, Electrical Eng. Dept., Technikon Natal, Durban, South Africa
Christine Hermann, CIE CB, Vienna, Austria
David Sliney, CIE DD6, Aberdeen Proving Ground, MD, USA

2. After approval of the agenda (Annex), DD6 reported on the progress of TC reports. He explained that quite a number of TCs had completed draft reports over the past several years, only to have the final report held up by incomplete graphics (the most common problem), or by the Division Editor (D6E). Since the completion of the CIE Business Plan last year, he had made a special effort to "shake loose" these reports, since in almost all cases, the technical work was complete, and therefore 95% of the total effort had been finished. He explained that a few TC Chairs finally responded after repeated reminders, and in addition, he had enlisted the help of several young physicists in his organization to complete graphics and assist in final language editing. Also, the CIE Central Bureau (CB) had become active in assisting in final editing and production. As a result, three reports had been completed and balloted:

a. TC 6-26 UVA1/UVA2 (Cesarini)--awaiting publication in the next CIE Photobiology collection, and additionally, TC Chair, Dr. Cesarini, requests publication in a photobiology journal: approved if CIE retains copyright
b. TC 6-27 Standard Erythemal Action Spectrum (McKinlay, CB) in draft standard
c. TC 6-40 Standard Erythemal Dose Unit (Diffey)--TC Report (rationale & draft standard combined original TC 6-27 action spectrum

The work of both TC 6-27 and TC 6-40 to developed into a combined recommended CIE Draft Standard as well as the technical Report from TC 6-40.

3. The following reports were now in the hands of DD6 and in a final editing, graphical completion stage and just forwarded, or soon to be forwarded, to the CB in Vienna:

a.	TC 6-14,	Blue Light Hazard (Kohmoto--required rewrite and new figures)
b.	TC 6-21	UV and Cataract (Sliney--required update)
c.	TC 6-24	UV-A Sunscreen Testing (final draft held up opposing positions on standard technique, but report of status of science to be the report.
d.	TC 6-25	Spectral Weighting of Sunlight--original TC did not furnish a report; new report prepared by new TC Chair Stephen Wengraitis
e.	TC 6-30	Eye Protection--final report completed; TC Chair, Dr. Wong requests publication in a photobiology journal: approved if CIE retains copyright
f.	TC 6-32	UV Skin Cancer Action Spectrum--modified SCUP action spectrum with constant value from 340 to 400 nm approved by TC, in final edit by Dr. Frank deGruijl
g.	TC 6-33	Immunosuppression--original TC report considered too technical by CB; Dr. Frank Allen, USFDA, is rewriting for broader audience understanding
h.	TC 6-34	Testing Protocols for UV Carcinogenesis Testing--Report finished and received on 2 September in DD6 office
h.	TC 6-35	UV Air Disinfection--Report finished by TC Chair, R. Vincent and artwork submitted by being scanned and reworked
j.	TC 6-36	UV Shading Materials--Francois Denner indicated continued interest, but requested appointment of a new TC Chair
i.	TC 6-37	Light and Retinal Disease--incorporating new animal data, even though editing was completed--Sliney
j.	TC 6-38	Photobiological Safety of Lamps--in final re-formatting at CB for circulation to BA; new standards effort recommended
k.	TC 6-41	UV Index [WMO/WHO/ICNIRP]--Weatherhead submitted final copy; ready for circulation
l.	Report:	High resolution erythemal action spectrum--reporter: A. Anders, completed report and paper was delayed for editing

4. The work in two TCs had never been completed to a point where a report could be issued, or the work was incorporated in other committees. It was therefore agreed to recommended to close the following TCs:

a.	TC 6-04	Photobiological terms, etc.--the information in this list of terms drafted by Mr. Muelemans was transferred to TC 7-04 for appropriate use. The information is available on computer disk from the CB.
b.	TC 6-17	Spatial and Temporal Effects on Human Behavior--another publication--a book--had been published by L. Ronchi and this material was now available in the general literature.

5. Because the SA Representative to D6 had to leave after lunch, the agenda was modified to discuss the work of TC 6-39 on fabric testing for an Ultraviolet Protection Factor (UPF). The original TC Chair had been Dr. Kok from SA, who had conducted pioneering studies of the UPF, showing the effects of wetness and stretch of the fabric under test. He reported his results at the 22 Session of the CIE in Melbourne in 1991. With his departure from CSIR, he had to resign the TC Chairmanship, and Dr. Peter Geis, Australian Radiation Laboratory (ARL), who had also worked on UPF concepts, kindly took the chairmanship. After quite a large effort during the past four years in Australia, Dr. Gies submitted a draft report to his TC this year which was

based upon the considerable experience of developing a Standards Association of Australia (SAA) standard on UPF testing. As was noted, the SAA standard limited the maximum value in UPF that could be reported, did not consider tests for the effect of wetness or stretch. This had led to concerns expressed by others working in this area and other members of the TC. In defense of the draft, Dr. Sliney pointed out that Peter Geis had emphasized that this was only a draft for comment and that he had based it upon the SAA standard, since that was in place and was the result of an effort to include clothing manufacturers, testing experts, et al. Dr. Sliney reassured some of those concerned that it was important to submit comments to Dr. Gies quickly and that all of these factors would surely be addressed. Natasha van Tonder had a copy of the TC draft with her, and explained that her organization would comment. She explained that Francois Denner, the SA member of the TC had asked her to review the document and she was working on that. Chrisita Ackerman described the tests that her laboratory performed routinely on fabrics, clothes and hats. She asked about the relevance to hat brims, described some problems with hats and clothes which had different color panels which had different UPF values. She explained that they would test for the effect of stretch if requested by the client.

6. Just before Lunch, discussions continued on the general subject of UPF, but with relationship to awnings, umbrellas and other shading materials. Dr. Sliney explained that Francois Denner, SA, had agreed two years ago to take over the TC 6-36, Shading Materials, which had been originally chaired by Prof. Maxim Mutzhas. However, Dr. Denner had explained that he would like one of his staff members who had worked in this area to take over the task. Dr. Sliney asked if Ms. Natasha van Tonder (SA) would be able to take on this task and she agreed. This led to a lengthy discussion on the special problems with providing a realistic value for UPF for shading materials, since in virtually all cases, except perhaps tents, a person under a shading material would also be exposed to lateral sky radiation. The substantial contribution of sand reflection and horizon sky radiation to exposure of a subject under a beach umbrella was given as a prime example. Dr. Sliney "volunteered" Mr. Stephen Wengraitis from his laboratory for the TC, since he had considerable experience in horizon sky measurements. Ms. van Tonder expressed enthusiasm for the technical challenge to determine what practical limits should really be placed on fabrics used for awnings, etc.

7. The next subject discussed after lunch was that of Lamp Safety. Dr. Sliney reported on the considerable progress made in TC 6-38, and reported that the TC had recommended the development of a CIE standard on this subject based largely on the current North American standard of the IESNA which was also an ANSI standard. The standard would then be submitted for approval by IEC. Based upon human exposure limits, a set of three risk groups and an exempt group had been developed. Labeling and other requirements were based upon the risk group. However, they recommended that specific requirements of lamp groups be left for a companion IEC standard developed within IEC TC 34A which dealt with lamps. The CIE standardization effort would be left to the science aspect and health implications; but, the CIE effort should employ the recommendations of the International Commission on Non-Ionizing Radiation (ICNIRP) rather than the earlier Threshold Limit Values (TLVs) of the American Conference of Governmental Industrial Hygienists (ACGIH). The ICNIRP guidelines were originally based upon the ACGIH TLVs and now differed only in the smallest aspect which would almost never result in a different classification. The ICNIRP guidelines--published in the September issue of *Health Physics*--had a 300-400-nm extension of the blue-light hazard

function B_λ, which had values of 0.01, and a relaxation of the long-term infrared cataract criterion for cold environments. Thus, a black-light would have a higher blue-light hazard and radiant warmers and heat lamps could be considered less hazardous. Inasmuch as the ACGIH in 1997 recommended updating their TLVs to be in line with the ICNIRP, the IESNA/ANSI standard would no doubt be updated in the future to be compatible.

8. The discussion then shifted to new work proposals. Based upon discussions with Indian delegates to the SANC/CIE Durban meeting, Richard Vincent (Chair, TC 6-35 on UV Air Disinfection), proposed the establishment of a TC 6-43 on UV Water Disinfection. He explained that it should examine the details and state of the art in UV water disinfection. This was of particular interest in the developing world. The international conference on water treatment exhibit in the Durban International Conference Center that week did not display this important technology, which was widely used, but recent work had been largely empirical efforts by many small manufacturers. Rolf Bergman and Gerrit van den Beld described the distinctions between the spectrum emitted by low pressure lamps and high pressure lamps used for this technique, and the interesting tradeoffs between the high efficiency for the 254-nm emission of low-pressure lamps but at low power in comparison with the reduced UV-C output of higher pressure Hg/UV fluorescent lamps which consumed more electrical power and the length of the treatment pipe, etc. After considerable discussion it was recognized that the TC Chair could be Prof. Jain of New Delhi, who was not present. Mr. Vincent would contact some US manufacturers and Gerrit van der Beld would also look for interested participants. Recommended:

TC 6-43 UV Water Disinfection

Chair: Dr. Jain (India)
Members: Richard Vincent and others to be nominated

9. Dr. Sliney read a proposal from Mr. L.A.G. Monard of the CSIR/NML, Pretoria, South Africa. He raised the issue regarding the need to standardize an action-spectrum for the phototherapy of neonatal jaundice (infant hyperbilirubinemia). He explained that simple instruments, such as the Goldilux bilirubin meter had been sent to him for calibration. The spectral response was in the blue, but upon his search for a recommended action spectrum, he found much conflicting information. He thought that sunlight from a window might be quite adequate. Dr. Sliney explained that this phototherapy was discovered by an observant nurse in England, who noted that babies near the window loss their hyperbilirubinemia. However, the modern argument for using lamp illumination has been the need to control the exposure dose, inasmuch as sunlight was not constant. It was therefore proposed that a TC be established on Illumination to examine the state of knowledge in this subject area and recommend a standardized action spectrum. Dave Sliney explained that the idea that blue lights were better originated with in-vitro (test-tube) photodegradation of bilirubin, but more recent studies have shown the process in vivo to be more complex and that white light sources were now thought superior in most neonatal intensive care units (NICUs) in the US. He stated that Dr. Pratesi in Florence had performed some very sophisticated photochemistry of bilirubin and he might be willing to help in an effort. It was thought that Mr. Monard would be willing to serve as TC Chair. It was therefore proposed to establish the following TC: Recommended:

TC 6-43 Illuminators for treatment of Infant Hyperbilirubinemia

Chair: Mr. L.A.G. Monard (S.A.)
Dr. Pratesi (I)
Myron L. Wolbarsht (USA)
Kim Jailink

10. Dr. Sliney then reported on a proposal from Germany to establish a TC relating to optical radiation hazard measurements in the worker's environment. He explained that Mr. Siekmann, BIA, St. Augustin, Germany had submitted a proposal to CEN Committee TC 169 chaired by Mr. Seidl, to establish such a work item in CEN; however, Michael Seidl recognized that this was really of international scope and not just related to lamps, and his idea was that such an effort really might be more appropriate in the CIE. Although concerned with measurement, it was presumed that the special nature of exposure geometry, photobiological hazard action spectra and hazard analysis really placed the project within the scope of D6. Dr. Sliney explained that although spectroradiometry was needed for lamp safety measurements in the controlled laboratory setting, broad-band meters with spectral responses to correspond to the hazard action spectra were needed in work-place measurements; many sources, such as welding arcs, were not steady, and measurements had to be made at many locations, quickly. The TC would examine the accuracy really needed for such measurements. Mr. Seidl had agreed to contact Dr. Siekmann to see if he would be willing to chair a CIE TC. Recommended:

TC 6-44 Optical Radiation Hazard Measurements in the Work Space

Chair: Dr. Harald Siekmann (D)
Members: A. Barrett, HSE (UK)
Brose, BG FE (D) *
Brueggemeyer, NLOe (D) *
Colin Driscoll, NRPB (UK)
G. Hee, INRS (F)
Maila Hietanen, FIOH (SF)
Jossen, SUVA (Switzerland)
K. Kohmoto, Toshiba (J)
Marion Morys. Solar Light (USA)
Ott, BAuA (D) *
David Sliney, USACHPPM (USA)
Bjorn Tengroth, Karolinska (S)
Ulf Wester, NIRP (S)
Teresa Goodman (U.K., CIE Div 2 Liaison)

It was not clear if all of the persons worked in non-ionizing radiation (*), and perhaps not all were needed, but with the expansion to an international scope, others were needed.

11. Mr. K. Kohmoto (J) had sent a fax and e-mail which proposed that a standardized action spectrum for UV disinfection be developed. He had explained that the DIN, US and other

published action spectra were not consistent. Richard Vincent explained that Nardell and First in the USA were attempting to define a better action spectrum. Recommended:

TC 6-46 Standard Action Spectrum for UV Disinfection

Chair: Ed Nardell (or First) (USA)
Members: Rolf Bergman (USA)
Myreck Peak (USA)
Richard Vincent (USA)

Other members outside the USA would be sought.

12. As expected, the attendees recommended that a separate TC be established to develop the lamp safety standard, inasmuch as TC 6-38 did not have lamp industry members. The following TC was proposed: Recommended:

TC-6-47 Photobiological Lamp Safety Standard

Members: Rolf Bergman (USA) -- TC Chair
Peter Drop (NL)
Maila Hietanen (F)
K. Kohmoto (J)
Robert Levin (USA)
Karl Schulmeister (A)
David Sliney (USA)
Ernst Sutter (D; IEC TC76 Liaison)
Teresa Goodman (U.K., CIE Div 2 Liaison)

12. There were no changes in liaison activities. The meeting adjourned at 16:00. All participants felt the meeting to have been highly worthwhile. Dr. Sliney thanked the ESKOM staff for their gracious hospitality.

David H. Sliney, Ph.D.
DD6

Annex

CIE DIVISION 6
Photobiology and Photochemistry

FINAL AGENDA

Thursday, 4 September 1997
Room 2, ESKOM Building, Durban

09:15 Opening and Introduction of Participants

09:30 Director's Report

a: *Reports approved or in final balloting*:

TC 6-26	UVA1/UVA2
TC 6-27	Standard Erythemal Action Spectrum
TC 6-40	Standard Erythemal Dose Unit

b: *Reports in Final Stage of Editing:*

TC 6-14,	Blue Light Hazard
TC 6-21	UV and Cataract
TC 6-24	UV-A Sunscreen Testing
TC 6-25	Spectral Weighting of Sunlight
TC 6-30	Eye Protection
TC 6-32	UV Skin Cancer Action Spectrum
TC 6-33	Immunosuppression (in rewrite)
TC 6-35	UV Air Disinfection
TC 6-37	Light and Retinal Disease
TC 6-38	Photobiological Safety of Lamps
TC 6-41	UV Index [WMO/WHO/ICNIRP]
Report:	High resolution erythemal action spectrum

c: *Work in progress*

TC 6-08	Guidelines for Obtaining Action Spectra (promised draft)
TC 6-11	Systemic, neuroendocrine effects of light
TC 6-16	Psychobiological effects (promised draft)
TC 6-28	Sunscreen Testing Standard (awaiting TC 6-24 report)
TC 6-29	Clothing UPF (1st draft in circulation)
TC 6-31	Immediate Pigment Darkening Action Spectrum (awaiting TC 6-24 report
TC 6-34	Test Protocols for UV Photocarcinogenesis (early draft)
TC 6-39	UV from Artificial Sources in Interior Lighting (early draft)
TC 6-42	Plant Growth Chambers

d: *Work abandoned or incomplete; recommended vote to close:*

TC 6-04	Photobiological terms, etc. (information transferred to TC 7-04)

TC 6-17 Spatial effects (other publication by L. Ronchi)

f: Note: CIE Publications are now available from IHS on CD-ROM

10:30 Review of TC Status (TC Chairs, Vacancy of ADD, and Problems in Editing of Reports)

11:00 Discussion on Current World-wide Activities toward Photobiologic Safety Standards for Lamps and Lighting Systems (TC 6-38); Proposed future standards activity

12:15Lunch

13:30 TC 6-29 Clothing and TC on Shading Materials:

14:00 Current Liaison Activities

14:10 Proposals for New Work: TC on measurements for occupational health and safety

16:00 (?) Adjournment